

# Type AHD

## SMT Aluminum Electrolytic Capacitors - Long Life, 105 °C

### Long Life Filtering, Bypassing and Power Supply Decoupling



In smaller capacitance values usually rated for 1000 to 2000 hours load life, the Type AHD delivers 5000 hour load life capability. While not a low-impedance type, the Type AHD is the choice for long life in small capacitance, general filtering applications. The vertical cylindrical cases facilitate automatic mounting and reflow soldering and Type AHD offers significant cost savings over tantalum capacitors.

#### Highlights

- ◆ +105 °C, 5000 Hour Load Life
- ◆ Capacitance Range: 0.47  $\mu$ F to 330  $\mu$ F
- ◆ Voltage Range: 10 Vdc to 100 Vdc

#### Specifications

|                                   |                                                                         |
|-----------------------------------|-------------------------------------------------------------------------|
| <b>Operating Temperature:</b>     | -40 °C to +105 °C                                                       |
| <b>Rated Voltage:</b>             | 10, 16, 25, 35, 50, 63 & 100 Vdc                                        |
| <b>Capacitance:</b>               | 0.47 $\mu$ F to 330 $\mu$ F                                             |
| <b>Capacitance Tolerance:</b>     | $\pm$ 20% @ 120 Hz and +20 °C                                           |
| <b>Leakage Current:</b>           | 0.01 CV or 3 $\mu$ A @ +20 °C, after two minutes (whichever is greater) |
| <b>Ripple Current Multiplier:</b> | <b>Frequency</b>                                                        |

|          |        |       |        |         |
|----------|--------|-------|--------|---------|
| 50/60 Hz | 120 Hz | 1 kHz | 10 kHz | 100 kHz |
| 0.7      | 1.0    | 1.3   | 1.7    | 1.7     |

#### Dissipation Factor:

| Voltage     | 10 V | 16 V | 25 V | 35 V | 50 V | 63 V | 100 V |
|-------------|------|------|------|------|------|------|-------|
| 4 to 6.3 mm | —    | 0.2  | 0.16 | 0.13 | 0.12 | —    | —     |
| 8 to 10 mm  | 0.3  | 0.23 | 0.18 | 0.16 | 0.14 | 0.18 | 0.18  |

**Load Life:** 5000 H @ +105 °C

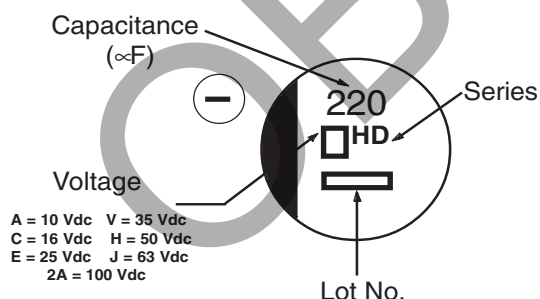
$\Delta$  Capacitance:  $\pm$ 30%  
DF:  $\leq$ 300% of limit  
DCL:  $\leq$ 100% of limit

**Shelf Life:** 1000 H @ +105 °C

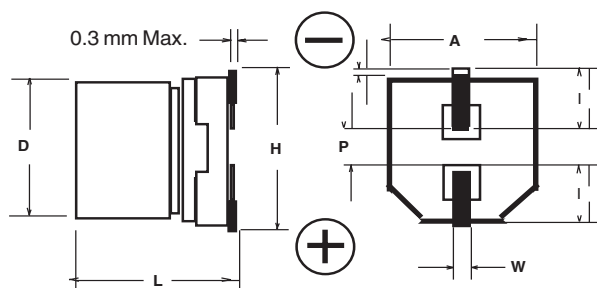
$\Delta$  Capacitance:  $\pm$ 20%  
DF:  $\leq$ 200% of limit  
DCL:  $\leq$ 100% of limit

| Low Temperature Stability       | Vdc            | 10 | 16 | 25 | 35 | 50 - 100 |
|---------------------------------|----------------|----|----|----|----|----------|
| <b>Impedance Ratio @ 120 Hz</b> | -22 ° / +20 °C | 6  | 2  | 2  | 2  | 2        |
|                                 | -40 ° / +20 °C | 12 | 5  | 3  | 3  | 3        |

#### AHD Series Marking



#### Outline Drawing



#### Case Dimensions

| Case Code | D $\pm$ 0.5 | L            | A $\pm$ 0.2 | H (max) | I (ref) | W              | P (ref) | K                 |
|-----------|-------------|--------------|-------------|---------|---------|----------------|---------|-------------------|
| B         | 4.0         | 5.8 +1, -2   | 4.3         | 5.5     | 1.8     | 0.65 $\pm$ 0.1 | 1.0     | 0.35 + 0.15/-0.20 |
| C         | 5.0         | 5.8 +1, -2   | 5.3         | 6.5     | 2.2     | 0.65 $\pm$ 0.1 | 1.5     | 0.35 + 0.15/-0.20 |
| D         | 6.3         | 5.8 +1, -2   | 6.6         | 7.8     | 2.4     | 0.65 $\pm$ 0.1 | 1.8     | 0.35 + 0.15/-0.20 |
| E         | 8.0         | 6.2 $\pm$ 3  | 8.3         | 9.5     | 3.4     | 0.65 $\pm$ 0.1 | 2.2     | 0.35 + 0.15/-0.20 |
| F         | 8.0         | 10.2 $\pm$ 3 | 8.3         | 10.0    | 3.4     | 0.90 $\pm$ 0.2 | 3.2     | 0.70 $\pm$ 0.20   |
| G         | 10.0        | 10.2 $\pm$ 3 | 10.3        | 13.0    | 3.5     | 0.90 $\pm$ 0.2 | 4.6     | 0.70 $\pm$ 0.20   |

## SMT Aluminum Electrolytic Capacitors - Long Life, 105 °C

## Ratings

| Cap<br>(μF)             | Catalog<br>Part Number | Max.<br>DCL<br>(μA/2<br>min) | Max.<br>Dissipation<br>Factor @<br>120 Hz<br>20 °C | Max.<br>ESR @<br>120 Hz<br>20 °C<br>(Ω) | Impedance<br>@ 100 kHz<br>20 °C<br>(Ω) | Max.<br>Ripple Current<br>@ 105°C<br>120 Hz<br>(mA) | Case<br>Code | Size (mm)<br>D x L | Quantity<br>per Reel |
|-------------------------|------------------------|------------------------------|----------------------------------------------------|-----------------------------------------|----------------------------------------|-----------------------------------------------------|--------------|--------------------|----------------------|
| 10 Vdc (13 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 100                     | AHD107M10E16T          | 10.00                        | 0.30                                               | 5.0                                     | 2.0                                    | 62                                                  | E            | 8 x 6.2            | 1000                 |
| 220                     | AHD227M10F24T          | 22.00                        | 0.30                                               | 2.3                                     | 1.5                                    | 93                                                  | F            | 8 x 10.2           | 500                  |
| 330                     | AHD337M10G24T          | 33.00                        | 0.30                                               | 1.5                                     | 0.8                                    | 118                                                 | G            | 10 x 10.2          | 500                  |
| 16 Vdc (20 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 10                      | AHD106M16B12T          | 3.00                         | 0.20                                               | 33.2                                    | 12.0                                   | 20                                                  | B            | 4 x 5.8            | 2000                 |
| 22                      | AHD226M16C12T          | 3.50                         | 0.20                                               | 15.1                                    | 7.2                                    | 33                                                  | C            | 5 x 5.8            | 1000                 |
| 47                      | AHD476M16D16T          | 7.50                         | 0.20                                               | 7.1                                     | 4.0                                    | 55                                                  | D            | 6.3 x 5.8          | 1000                 |
| 100                     | AHD107M16F24T          | 16.00                        | 0.23                                               | 3.8                                     | 1.5                                    | 89                                                  | F            | 8 x 10.2           | 500                  |
| 220                     | AHD227M16G24T          | 35.20                        | 0.23                                               | 1.7                                     | 0.8                                    | 113                                                 | G            | 10 x 10.2          | 500                  |
| 25 Vdc (31 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 4.7                     | AHD475M25B12T          | 3.00                         | 0.16                                               | 56.4                                    | 12.0                                   | 15                                                  | B            | 4 x 5.8            | 2000                 |
| 10                      | AHD106M25C12T          | 3.00                         | 0.16                                               | 26.5                                    | 7.2                                    | 26                                                  | C            | 5 x 5.8            | 1000                 |
| 22                      | AHD226M25D16T          | 5.50                         | 0.16                                               | 12.1                                    | 4.0                                    | 42                                                  | D            | 6.3 x 5.8          | 1000                 |
| 33                      | AHD336M25D16T          | 8.30                         | 0.16                                               | 8.0                                     | 2.0                                    | 52                                                  | D            | 6.3 x 5.8          | 1000                 |
| 47                      | AHD476M25E16T          | 11.80                        | 0.18                                               | 6.3                                     | 1.5                                    | 56                                                  | E            | 8 x 6.2            | 1000                 |
| 100                     | AHD107M25F24T          | 25.00                        | 0.18                                               | 3.0                                     | 0.8                                    | 84                                                  | F            | 8 x 10.2           | 500                  |
| 35 Vdc (44 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 4.7                     | AHD475M35B12T          | 3.00                         | 0.13                                               | 45.9                                    | 12.0                                   | 17                                                  | B            | 4 x 5.8            | 2000                 |
| 10                      | AHD106M35C12T          | 3.50                         | 0.13                                               | 21.6                                    | 7.2                                    | 28                                                  | C            | 5 x 5.8            | 1000                 |
| 22                      | AHD226M35D16T          | 7.70                         | 0.13                                               | 9.8                                     | 4.0                                    | 47                                                  | D            | 6.3 x 5.8          | 1000                 |
| 33                      | AHD336M35E16T          | 11.60                        | 0.16                                               | 8.0                                     | 2.0                                    | 53                                                  | E            | 8 x 6.2            | 1000                 |
| 47                      | AHD476M35F24T          | 16.50                        | 0.16                                               | 5.6                                     | 1.5                                    | 79                                                  | F            | 8 x 10.2           | 500                  |
| 100                     | AHD107M35G24T          | 35.00                        | 0.16                                               | 2.7                                     | 0.8                                    | 101                                                 | G            | 10 x 10.2          | 500                  |
| 50 Vdc (63 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 0.47                    | AHD474M50B12T          | 3.00                         | 0.12                                               | 424.0                                   | 12.0                                   | 5                                                   | B            | 4 x 5.8            | 2000                 |
| 1                       | AHD105M50B12T          | 3.00                         | 0.12                                               | 199.0                                   | 12.0                                   | 7                                                   | B            | 4 x 5.8            | 2000                 |
| 2.2                     | AHD225M50B12T          | 3.00                         | 0.12                                               | 90.4                                    | 12.0                                   | 12                                                  | B            | 4 x 5.8            | 2000                 |
| 3.3                     | AHD335M50B12T          | 3.00                         | 0.12                                               | 60.3                                    | 12.0                                   | 16                                                  | B            | 4 x 5.8            | 2000                 |
| 4.7                     | AHD475M50C12T          | 3.00                         | 0.12                                               | 42.3                                    | 7.2                                    | 21                                                  | C            | 5 x 5.8            | 1000                 |
| 10                      | AHD106M50D16T          | 5.00                         | 0.12                                               | 19.9                                    | 4.0                                    | 33                                                  | D            | 6.3 x 5.8          | 1000                 |
| 22                      | AHD226M50E16T          | 11.00                        | 0.14                                               | 10.6                                    | 2.0                                    | 50                                                  | E            | 8 x 6.2            | 1000                 |
| 33                      | AHD336M50F24T          | 16.50                        | 0.14                                               | 7.0                                     | 1.5                                    | 74                                                  | F            | 8 x 10.2           | 500                  |
| 47                      | AHD476M50G24T          | 23.50                        | 0.14                                               | 4.9                                     | 0.8                                    | 94                                                  | G            | 10 x 10.2          | 500                  |
| 63 Vdc (75 Vdc Surge)   |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 10                      | AHD106M63E16T          | 6.30                         | 0.18                                               | 29.8                                    | 2.0                                    | 45                                                  | E            | 8 x 6.2            | 1000                 |
| 22                      | AHD226M63F24T          | 13.86                        | 0.18                                               | 13.6                                    | 1.5                                    | 65                                                  | F            | 8 x 10.2           | 500                  |
| 33                      | AHD336M63G24T          | 20.79                        | 0.18                                               | 9.0                                     | 0.8                                    | 80                                                  | G            | 10 x 10.2          | 500                  |
| 100 Vdc (125 Vdc Surge) |                        |                              |                                                    |                                         |                                        |                                                     |              |                    |                      |
| 3.3                     | AHD335M2AE16T          | 3.30                         | 0.18                                               | 90.4                                    | 2.0                                    | 30                                                  | E            | 8 x 6.2            | 1000                 |
| 4.7                     | AHD475M2AF24T          | 4.70                         | 0.18                                               | 63.5                                    | 1.5                                    | 50                                                  | F            | 8 x 10.2           | 500                  |
| 10                      | AHD106M2AF24T          | 10.00                        | 0.18                                               | 29.8                                    | 1.5                                    | 55                                                  | F            | 8 x 10.2           | 500                  |
| 22                      | AHD226M2AG24T          | 22.00                        | 0.18                                               | 13.6                                    | 0.8                                    | 70                                                  | G            | 10 x 10.2          | 500                  |

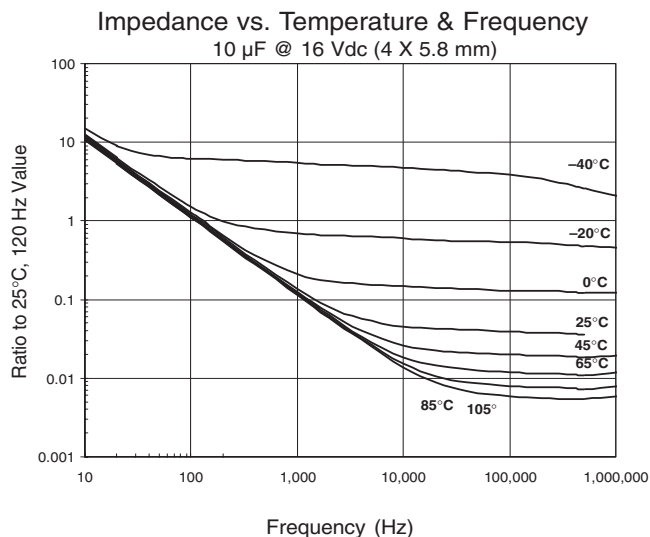
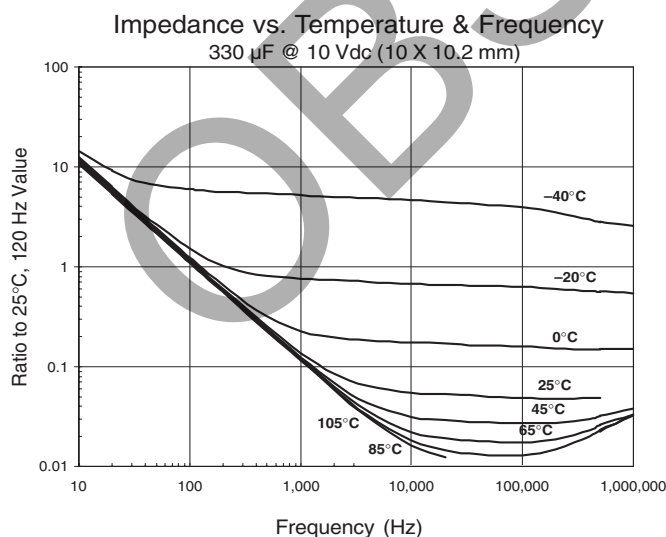
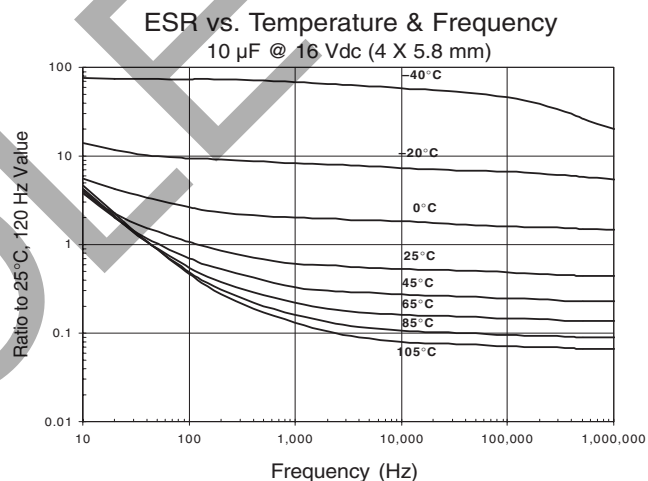
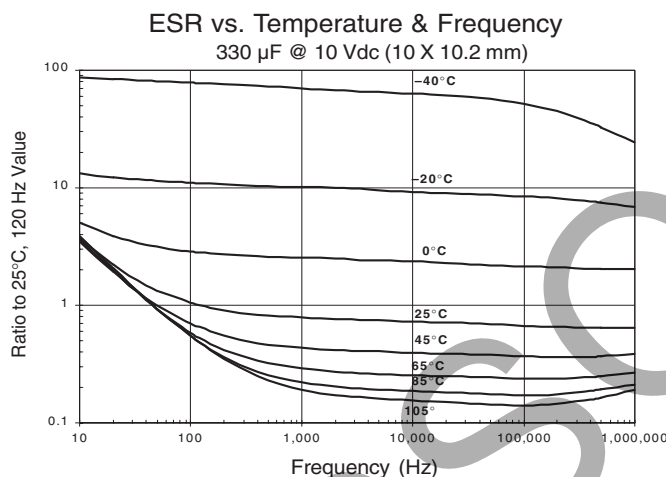
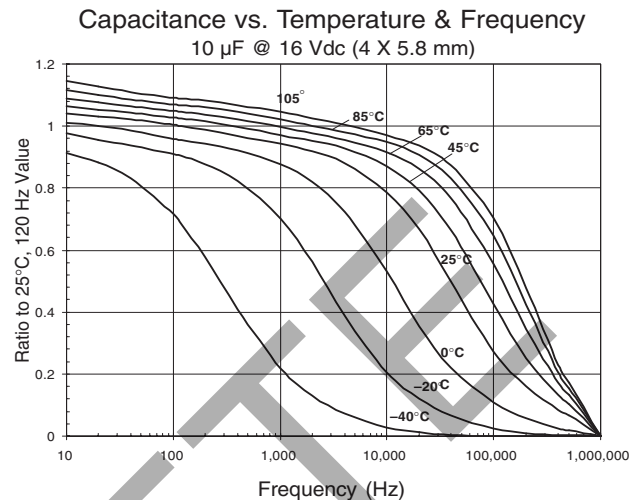
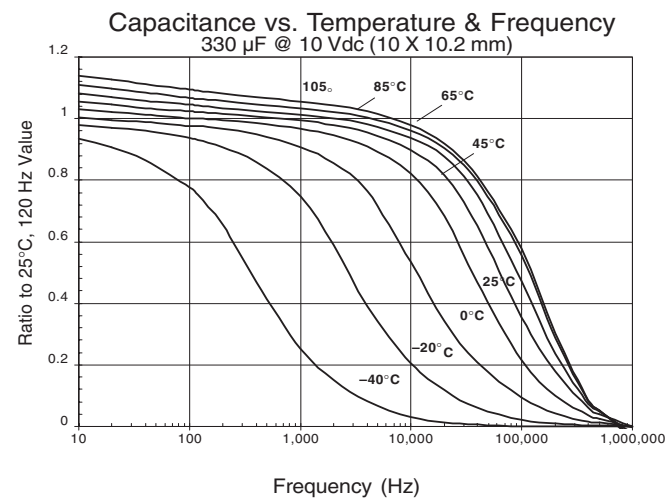
## Part Numbering System

|            |                                                                 |                          |                                                          |              |                                                                |
|------------|-----------------------------------------------------------------|--------------------------|----------------------------------------------------------|--------------|----------------------------------------------------------------|
| <b>AHD</b> | <b>106</b>                                                      | <b>M</b>                 | <b>16</b>                                                | <b>B</b>     | <b>12T</b>                                                     |
| Type       | Capacitance                                                     | Capacitance<br>Tolerance | Voltage                                                  | Case<br>Code | Packaging<br>Information                                       |
|            | 104 = 0.1 μF<br>105 = 1.0 μF<br>106 = 10.0 μF<br>107 = 100.0 μF | M = ±20%                 | 10 = 10 Vdc<br>16 = 16 Vdc<br>25 = 25 Vdc<br>35 = 35 Vdc |              | 12 = Carrier tape<br>Width (mm)<br>T = Tape & Reel<br>B = bulk |

# Type AHD

## SMT Aluminum Electrolytic Capacitors - Long Life, 105 °C

### Typical Performance Curves

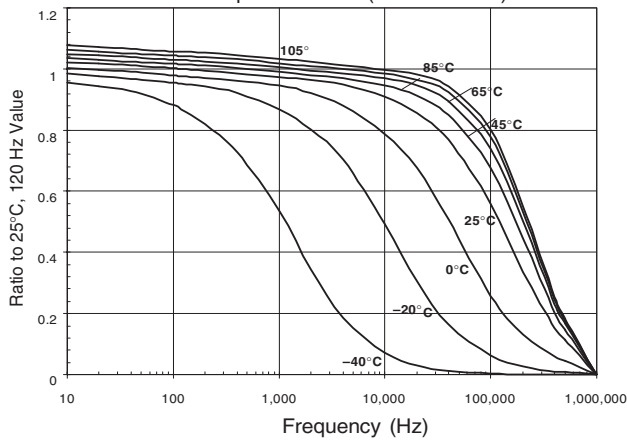


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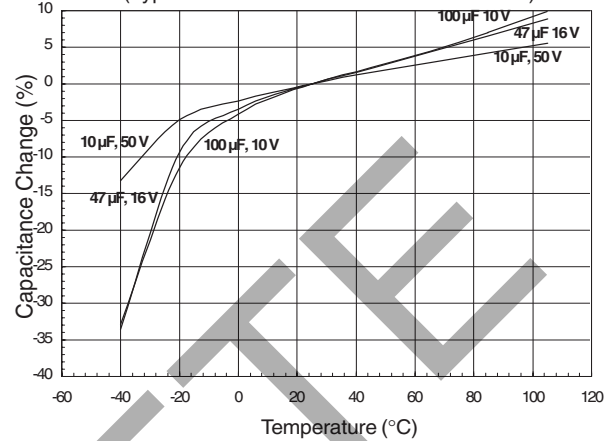
## SMT Aluminum Electrolytic Capacitors - Long Life, 105 °C

### Typical Performance Curves

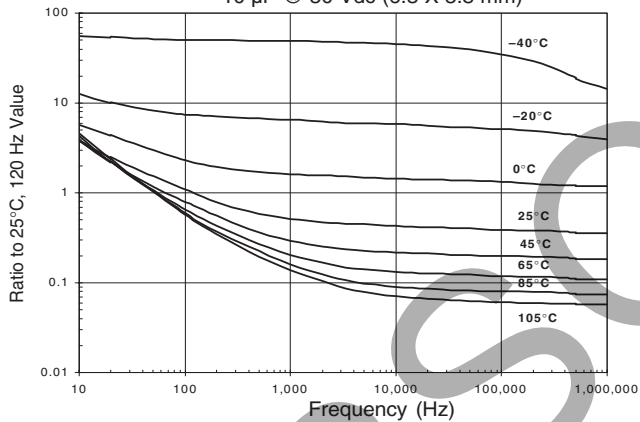
Capacitance vs. Temperature & Frequency  
10  $\mu$ F @ 50 Vdc (6.3 X 5.8 mm)



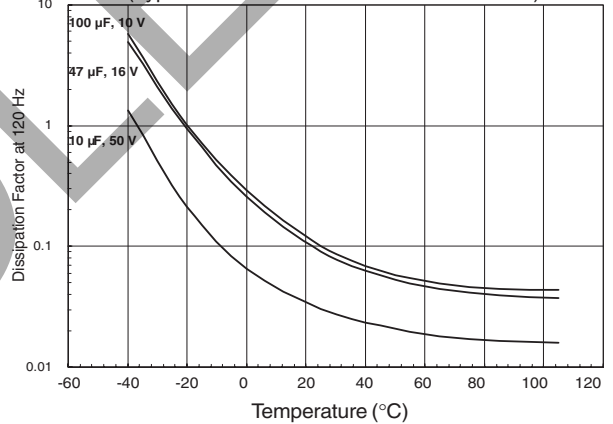
Capacitance Change vs. Temperature  
(Typical Performance AHD Series @ 120 Hz)



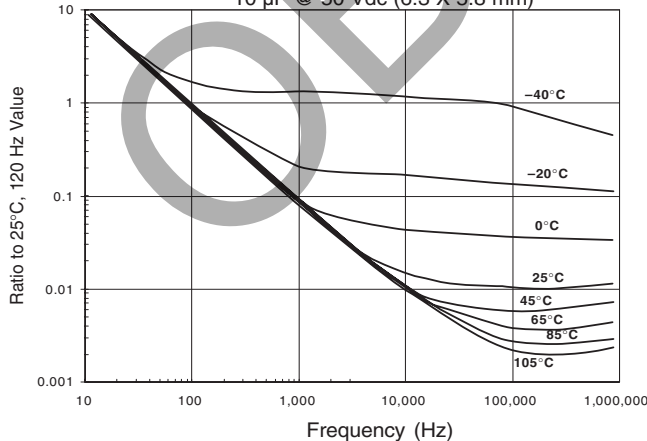
ESR vs. Temperature & Frequency  
10  $\mu$ F @ 50 Vdc (6.3 X 5.8 mm)



Dissipation Factor vs. Temperature  
(Typical Performance AHD Series @ 120 Hz)



Impedance vs. Temperature & Frequency  
10  $\mu$ F @ 50 Vdc (6.3 X 5.8 mm)



Impedance vs. Temperature & Frequency  
100  $\mu$ F @ 35 Vdc (10 X 10.2 mm)

